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AUTHOR Wang, Yu-mei; Cohen, Arlene
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ABSTRACT

This exploratory study was designed to investigate the use of services available on the Internet by faculty in a public university in the United States. It examined the manner and frequency of faculty use of the Internet, their perception of the role of different Internet services in support of teaching and research, and the factors associated with their use of these Internet services. A 30-item questionnaire was distributed at faculty meetings; 158 completed questionnaires were returned (88% response rate). Results show that a majority of faculty were exposed to Internet use. Eighty-five percent of the faculty used at least one of the Internet services. Faculty were aware of the role of the Internet in their professional development and they used it in support of teaching and research. E-mail is still one of the most popular services among the faculty, even though other services are gaining popularity. Faculty use of mailing lists was low. For information search and retrieval, the World Wide Web showed the highest rate of use, with Gopher rated second and FTP (file transfer protocol) the lowest. Results point to the need for faculty training in order to promote the maximum use of Internet services. Several graphs and tables present data. (AEF)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

University Faculty Use of the Internet

Yu-mei Wang
Arlene Cohen
University of Guam

U.S. DEPARTMENT OF EDUCATION
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The Internet, one of the most powerful tools ever invented in human history, has changed both the way people communicate with each other, and the way information is accessed. The rich resources on the Internet are beneficial to all educational endeavors, supporting teaching, research and other academic activities. Universities and colleges, where academic dialogue and information resources are essential for professional success, are without a doubt the most likely to reap the benefits of the Internet.

Pioneers on university and college campuses first started experimenting with the Internet in teaching and research, using mainly e-mail, real-time conferences, and most recently, the World Wide Web. These experiments established the value of the Internet as an effective tool in facilitating teaching and research. However, the real impact of the Internet on university campuses will not be effectively realized unless the majority of faculty begin using the network.

Although the benefit of the Internet to education is obvious, research investigating the use of the variety of Internet services by faculty on university campuses is lacking. A careful search of the literature reveals little published research on faculty use of the Internet. The few available studies tended to focus on the use of a particular Internet service, such as e-mail or mailing lists, although the Internet provides many more services. These services include FTP (File Transfer Protocol), Telnet, Gopher and the World Wide Web (WWW). These services can be utilized as valuable educational resources. Consequently, it is essential to investigate how faculty utilize the variety of internet services. Only then, can appropriate strategies be developed to promote the maximum use of the Internet among faculty.

The previous research attempted to provide baseline data about the use of the Internet by academics. However, subjects involved in these studies were either university students or selective network users, and limited Internet services were examined. None of the research dealt with all faculty within a university campus using the broad range of Internet resources.

Schaefermeyer and Sewell (1988) conducted a survey via *BITNET*, the largest academic computer network in the world. Their investigation focused on the use of e-mail by *BITNET* scholars to determine if e-mail was an effective tool for their professional development. The survey found that most professionals used e-mail to communicate with those who shared similar interests at distant locations. Users tended to use e-mail as a tool for research more than teaching. This finding was probably due to the fact that the majority of users did not hold a teaching job. For those that did teach, access to the Internet was limited for their students. They also found that users who responded to their survey were those with quick and easy access to the *BITNET* network. The study identified "speed", "convenience", "time-saving", and "asynchronicity" as the advantages of using e-mail.

Realizing the importance of a computer network for academic development, Grabowski and Pusch (1990) conducted a study on how graduate students at their university used e-mail. Their research generated a profile of likely users in a graduate school and studied factors that promote or hinder e-mail use. Generally speaking, they found that e-mail is used for exchanging information, asking questions, discussing opinions, helping on course assignments, making friends, and alleviating boredom. The study also identified the reasons for using e-mail as : (a) no time/place limits, (b) easy access, (c) knowledge of computers, (d) ease of use, (e) convenience, and (f) try new things (p. 280).

"Mailing lists" is another service provided by the Internet. The "mailing list" concept has been referred to by various names such as listservs, electronic discussion groups, or e-conferences. A mailing list differs from e-mail in that it provides a forum for professionals to broadcast their ideas to a larger audience with similar interests. Judith Weedman's study (1994) investigated how humanities scholars used a mailing list called *Humanist*. Her research confirmed that the list provided humanities scholars with an important vehicle for engaging in exploratory discussions, seeking specific information, posting pre-publication ideas and following new developments in their own and related fields. The study revealed that humanities scholars used the list most for research, followed by professional/technical work, with teaching being the least. Humanities scholars considered the list a useful resource.

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The list allowed scholars to reach out to a larger portion of the community of scholars, not previously available andthe majority of them preserved messages posted on the list for a long time.

In another study involving mailing lists, Kovas (1995) confirmed that mailing lists are a valuable internet tool for academics. The study examined the use of mailing lists by professionals in the Library and Information Science field. The survey was sent to 57 library and information science related mailing lists. The findings of the study indicated that mailing lists are an important information source for these professionals, both for personal use and job-related service. They used mailing lists as a source for their own professional and research development, while at the same time using the lists to enhance the quality of library services to patrons. Mailing lists were used as a complement to other information sources such as academic journals, face-to-face conferences, regular mail and phone contacts.

Landis' study (1995) focused on how science educators used a variety of internet resources. The survey was posted to 27 newsgroups and a small group of science educators in secondary schools and colleges responded. The results showed that these science teachers used the internet for activities, which included communicating by e-mail, conducting library searches, downloading information, and participating in newsgroups. Respondents, including the most experienced users, reported difficulties in downloading information from the Internet.

An Australian study (1994) looked at how academics in Australian universities use the Australian Academic and Research Network (AARNet) to support their academic role. Technology directors from thirteen universities were each asked to identify twenty regular users of AARNet in their institutions. A survey was then mailed to these AARNet users. The results showed that e-mail was the service most used (99%) and considered most important (66%), followed by remote login (85%), News (44%), Gopher (15%) and WAIS (6%).

The study provided strong evidence that Australian academics used AARNet "to enhance the efficiency, quality and productivity of their academic work" (p. 29). Australian academics were utilizing AARNet to facilitate scholarly activity in their field; seek and disseminate information, exchange ideas and facilitate professional collaboration. Respondents perceived AARNet beneficial in terms of "increased efficiency; improved access to facilities, data, and collaborators; and an enhanced sense of disciplinary collegiality" (p. 29).

Horney and Henriquez (1993) conducted the first systematic and large scale survey on educators' use of the Internet. The study involved 550 educators, and found that the network is becoming an important component in their teaching and learning activities. However, the survey focused on K-12 educators and did not give any indicator of how university faculty used the Internet.

To date, no research has been found focusing on the university faculty's use of a variety of internet services in the United States. This exploratory study was designed to investigate the use of services available on the Internet by faculty in a public university in the United States; the manner and frequency of faculty use of the internet; their perception of the role of different Internet services in support of teaching and research; and the factors associated with their use of these internet services.

Methodology

The sample population consisted of all the faculty in a public university in the United States during the spring semester, 1996. The total sample population for this study was 180. A questionnaire was developed containing items related to each of the research questions. The questionnaire contained 30 questions with yes/no, multiple choice, and open-ended questions. The questionnaire was distributed at faculty meetings. One hundred and fifty-eight completed questionnaires were collected. The response rate was 88%.

Results

Background information on the faculty included gender, age, their internet experience, and the way they accessed the Internet . Approximately two thirds of the faculty responding to the survey were males (66%). Faculty between the ages of 41-50 comprised the largest age group (45%). Eighty-five percent of the faculty responding to the survey were using the Internet, with their internet experience varying from months to years. E-mail is the service most used by the faculty (96%), followed by the World Wide Web (55%), Gopher (48%), Mailing Lists (29%), and FTP (22%). Approximately half of the faculty had internet access at home (Figure 1 & Figure 2).

Figure 1. Gender, Age and Internet User

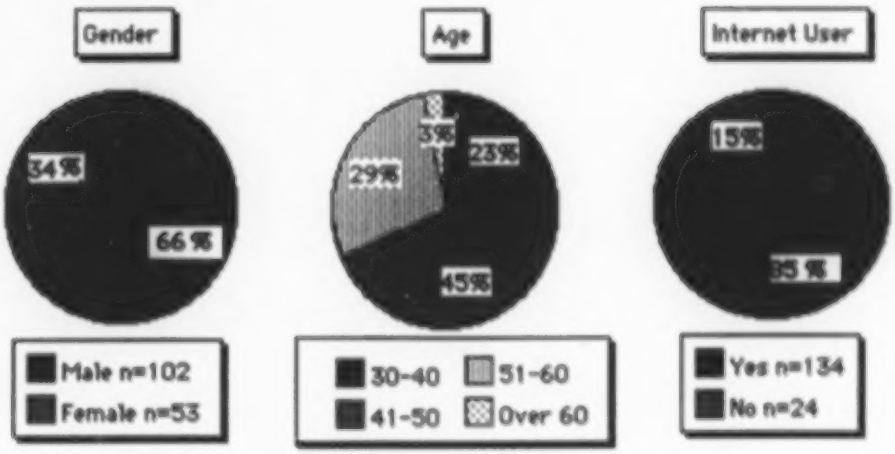
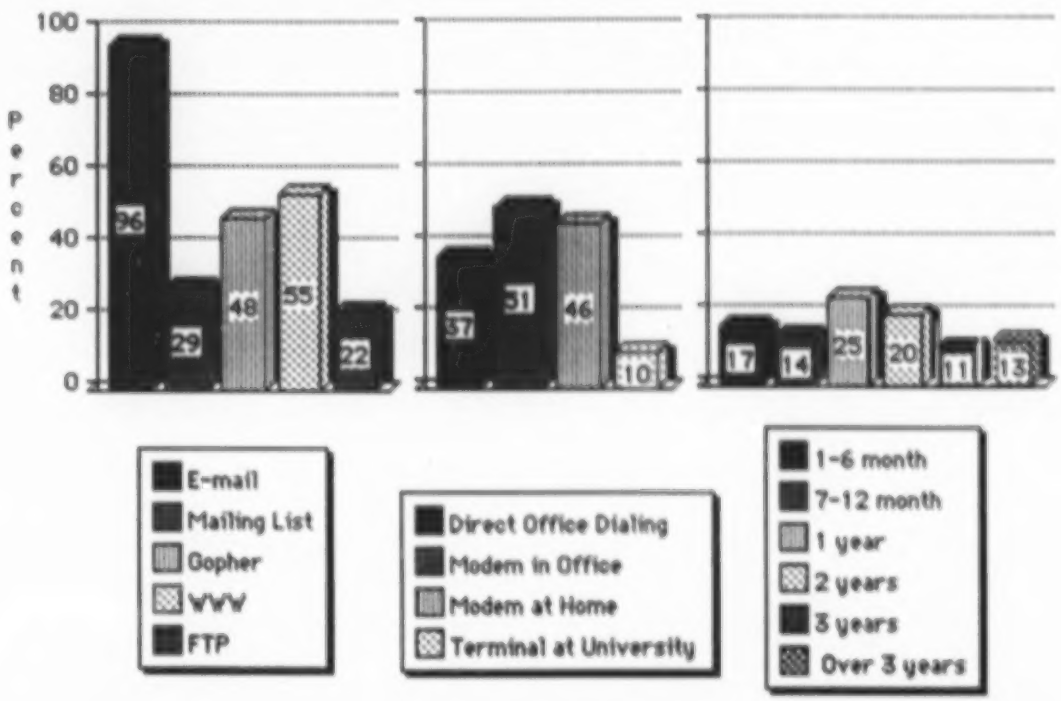


Figure 2. Use of Internet Services, Access and Internet Experience



The time faculty spent using internet services varied considerably (Table 1). Approximately 53% of the faculty spent over three hours per week using e-mail, as opposed to just 25% using mailing lists over 3 hours on a weekly basis. Additionally, 21% used WWW, 11% used Gopher, and only 4% used FTP over 3 hours per week.

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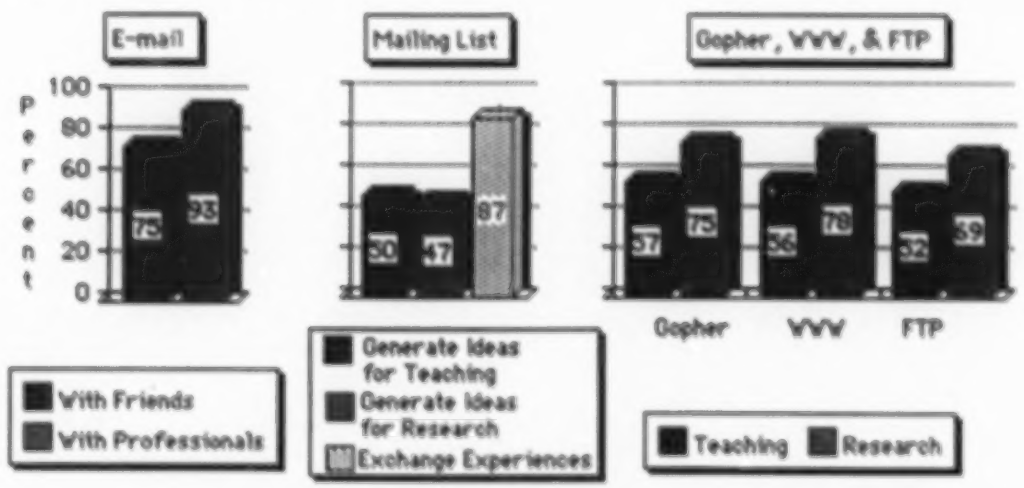
Table 1. Time Spent on the Use of the Internet Services (Hours Per Week)

	1 hour	2 hours	3 hours	4 hours	5 hours and over	n
E-mail	22%	25%	13%	17%	23%	128
Mailing List	39%	36%	0%	6%	19%	31
WWW	53%	26%	7%	5%	9%	62
Gopher	72%	17%	4%	2%	5%	53
FTP	91%	5%	4%	0%	0%	23

The reasons faculty use the variety of internet services are presented in Figure 4. The major reasons given for using e-mail were to communicate with professionals (93%) and friends (75%). Mailing lists were used to exchange experiences with other professionals (87%), generate ideas for teaching (50%) and research (47). Faculty used WWW, Gopher and FTP for research to a higher degree than for teaching (78% vs. 56%; 75% vs. 57%; 69% vs. 52%).

Figure 3. Reasons for Using Different Internet Services



For those responding to the survey, only three faculty provided reasons for not using e-mail. They all indicated they did not have a need. A majority of the faculty did not use mailing lists. Almost 99% reported they did not know how to access lists appropriate to their field or interest (Table 2). Faculty that did not use the other internet services generally had an interest and need, but lacked the knowledge necessary to use the service.

Table 2. Reasons for the Non-Use of the Different Internet Tools

	Lack of Knowledge	Lack of Access	Lack of Need	Lack of Interests	n
E-mail	67%	33%	100%	67%	3
Mailing List	38%	99%	10%	7%	94
Gopher	57%	13%	6%	7%	40
WWW	62%	27%	5%	2%	37
FTP	57%	10%	8%	5%	59

When surveyed about their perception of the importance of internet tools to support teaching and research, the percentages considering internet tools as important or very important were 78% for e-mail, 63% for mailing lists, 69% for Gopher, 74% for the World Wide Web, and 60% for FTP (Table 3).

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Table 3. Perception of importance on the Internet Tools in Teaching and Research

	Not important	Somewhat Important	Important	Very Important	n
E-mail	5%	17%	25%	53%	139
Mailing List	10%	27%	30%	33%	90
Gopher	7%	24%	38%	31%	95
WWW	6%	20%	35%	39%	105
FTP	13%	27%	32%	28%	68

There was no difference in the use of e-mail between the male and female faculty, although there was a slightly higher percentage of female faculty who used mailing lists than did male faculty. More male faculty used Gopher, WWW and FTP than female faculty. However, due to the imbalance of numbers between male (66%)and female (34%), a conclusion cannot be made.

Only four faculty members in the over 60 age group responded to the survey. Faculty in the 31-40 age group were the most active in using a variety of the internet tools. There was a higher percentage of use of each internet service in this age group than there was in other age groups. Again, due to the imbalance of numbers in age groups, the relationship between age and use of internet services can not be determined.

Table 4. Effect of Gender and Age on the Use of the Internet Tools

	E-Mail	Mail List	Gopher	WWW	FTP	n
Gender						
Male	98%	28%	53%	60%	26%	88
Female	98%	32%	38%	46%	14%	51
Age						
30-40	100%	47%	50%	59%	31%	32
41-50	99%	24%	44%	52%	16%	68
51-60	94%	29%	47%	56%	21%	34
Over 60	100%	0%	75%	75%	25%	4

Faculty's perception of the role of a internet service in support of teaching and research was associated with the use of a particular service. There was a higher percentage of use of an internet service among those who considered it important or very important in support of teaching and research than there was among those who thought otherwise (Table 5). Time spent on the internet was related to the use of internet services. The longer the user was exposed to the Internet, the more likely the user tended to utilize the variety of Internet services (Table 6).

Table 5. Effect of Faculty's Perception on the Use of the Internet Tools

	Not Important	Somewhat Important	Important	Very Important	n
E-mail	80%	95%	100%	99%	129
Mailing List	0%	32%	46%	60%	82
Gopher	17%	61%	72%	79%	84
WWW	40%	61%	67%	80%	96
FTP	0%	54%	37%	63%	60

Table 6. Effect of Faculty's Internet Experience on the Use of the Internet Tools

	1-6 Month	7-12 Month	1 Year	2 Years	3 Years	Over 3 Years	n
E-mail	96%	95%	100%	100%	100%	100%	140
Mailing List	18%	5%	31%	30%	41%	61%	140
WWW	18%	50%	50%	56%	47%	61%	140
Gopher	18%	55%	58%	63%	59%	72%	140
FTP	0%	0%	19%	41%	18%	56%	140

Discussion

This study shows that a majority of the faculty at the surveyed university were exposed to internet use. Eighty-five percent of the faculty used at least one of the internet services. Faculty were aware of the role of the Internet in their professional development. They used the internet in support of teaching and research, although some of the internet resources were utilized in a limited way.

E-mail is still one of the most popular services among the faculty even though other internet services, such as the World Wide Web, are gaining popularity in recent years. The popularity of e-mail is probably due to e-mail's role in allowing quick and direct personal communication. Faculty judged e-mail an exciting and convenient tool to keep them connected with professionals world wide. They reported a variety of academic activities via e-mail. Since other internet services are still new to most faculty, this might be another reason for high e-mail use. Faculty need time to learn the technology.

Faculty use of mailing lists was low (29%). Mailing lists provide an important forum for professionals to exchange ideas, information and experiences. They also allow for frequent dialogues and heated debates among professionals, contributing greatly to teaching and research. Faculty who participated in mailing lists were highly positive about their experiences. These faculty reported using mailing lists to keep current on issues of concern and maintain contact with professionals having the same interests. One faculty wrote: "When I was preparing for a new course. I found four mailing lists, all of which included a teacher whose students wished to communicate with students from another culture. I benefited. They benefited. We all did what we do better."

The majority of the faculty surveyed had no knowledge about searching for and subscribing to an appropriate mailing list, which can be a formidable task. At times, it can be like seeking a needle in a hay since countless many mailing lists exist in almost all disciplines. When a seemingly appropriate mailing list is found and a user subscribes, he/she might then find that it is not appropriate to his/her needs. Further, the dynamic nature and frequent obsolescence of mailing lists contribute to frustrations encountered with finding appropriate mailing lists.

However, to alleviate some of the frustrations, information about mailing lists is becoming more pervasive. Faculty can use these information to locate an appropriate mailing list, rather than relying on random database search. Some academic journals and magazines now recommend mailing lists to their subscribers. Faculty who find beneficial mailing lists can pass the information to their colleagues. Using mailing lists that are recommended and tried by other professionals saves a great amount of time and anxiety for faculty new to mailing lists. Another source of information about mailing lists can be obtained from professional librarians on university campuses.

For information search and retrieval, the World Wide Web showed the highest rate of use, with Gopher rated the second and FTP the lowest. Compared with Gopher and FTP, the World Wide Web has a better user-interface for information access and retrieval. It has the advantage of allowing users to make links while navigating through information. Users can also see the information before they decide whether they want a copy of it. In recent years, enormous amounts of information is available on the World Wide Web. However, each service has its advantages and disadvantages. Faculty need to be aware of potentials and limitations of each internet service and utilize them to their benefit.

The results of the study indicate that faculty used World Wide Web, Gopher, and FTP more for research than teaching. Moreover, it seems that faculty turned to other resources such as e-mail and mailing lists for exchanging and generating teaching ideas.

Even though the World Wide Web comprised the highest rate of use, only about half of the faculty were using it (55%). Among those who used the World Wide Web, about one fifth spent over three hours per week using the Web. Faculty expressed their frustration in their comments which included, "The World Wide Web is short on information, causing waste of time searching different web sites," "The World Wide Web is complex and time consuming," "Get stuck in the mud during surfing."

Information searching on the World Wide Web is a challenge. The way information is arranged and accessed differs from traditional information resource organization in a library. Faculty need to break their habitual patterns of information seeking behavior and develop new information seeking strategies. At the moment, information searching on the World Wide Web for most people is like combing the beach for treasures. This process of "treasure hunting" is not attractive to faculty since most of the time, they want immediate access to the information they need. If they experience any frustration in accessing and retrieving information, faculty will look to other sources.

Information searching on the World Wide Web is complex since it requires both technical skill and information searching skills. Neither skill alone can complete the task. The types of information available on the World Wide Web might also influence faculty use. One possible solution is cooperation between campus librarians and faculty to develop their information searching skills. Librarians and faculty can work together to locate and disseminate discipline-specific World Wide Web sites.

The results of this study pointed to the need for faculty training in order to promote the maximum use of internet services. This was also indicated in the many comments found in the survey.

Training workshops should be offered in a variety of formats, including hands-on workshops, seminars, and strategy sharing workshops. Workshops should not only focus on the technical aspect of the internet, but on increasing faculty's awareness of available internet resources, the role of the Internet in teaching and learning, strategies of surfing the Internet, and the potential and limitations of each internet service. Workshops should answer questions such as; What is the appropriate tool for a particular networking activity? What are the strategies for information searching and retrieval? How to incorporate the Internet resources into classroom activities? How to utilize resources such as on-line help and Internet reference books?

Training should be offered on different levels; university, college, and division. Training workshops should provide immediate benefits to faculty and be relevant to their professional development. When faculty can see a clear pay off, they will be motivated to learn to use the Internet.

Training should be done as a team effort. Librarians, experienced internet faculty users, and technical staff should work together to design and offer workshops, utilizing each others' expertise. With their professional skills in seeking and accessing information, librarians can play a key role in training, coupled with the subject expertise of faculty and the "behind the scenes" technical support of the technology staff, training curriculum can be designed to meet the needs of faculty at all levels.

Though faculty training is essential in promoting the use of the Internet, faculty can only gain experience by actually using the Internet. Technical support is crucial to ensure faculty's use of the Internet. Even the most experienced users can encounter difficulties using the Internet. The majority of the faculty reported that their most frustrating experience was having technical problems while using the internet. This included logging on failure,

computer crashes, getting cut off in the middle of sessions, and difficulties in downloading and uploading files. Faculty need access to technicians who are available at any time to address their technical problems. As one faculty indicated: "I wish there were more specific individuals on campus who could address technical questions about the Internet."

It is unlikely that universities can hire an adequate number of technicians to provide such a timely service. Usually, available technical staff on campus are busy operating and maintaining the campus network, making it almost impossible to help individual faculty solve his/her technical problems. One solution might be to utilize students as resources. For example, students majoring in the Computer Science could take practicums and be assigned to specific departments or colleges to help faculty members.

Conclusions

This study generated baseline information and provided insights on how faculty use the internet. With the aggressive development of computer technology, the Internet will play an even greater role in academic settings, presenting a great challenge to university faculty. There are many factors that impact faculty use of the internet. It is essential to continue studying how faculty use the Internet and identify the factors associated with internet use so that the benefit of the internet can be fully realized.

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